UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,904	03/02/2004	Jason L. Mitchell	00100.02.0045	2636

29153 7590 03/23/2009
ADVANCED MICRO DEVICES, INC.
C/O VEDDER PRICE P.C.
222 N.LASALLE STREET
CHICAGO, IL 60601

EXAMINER	
PAPPAS, PETER	

ART UNIT	PAPER NUMBER
2628	

MAIL DATE	DELIVERY MODE
03/23/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.**	**Applicant(s)**	
	10/790,904	MITCHELL ET AL.	
	Examiner	**Art Unit**	
	PETER-ANTHONY PAPPAS	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1, 6 and 17 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Said claims fail to fall within one of the four statutory categories of invention. Supreme Court precedent1 and recent Federal Circuit decisions2 indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example, a process for object based visibility culling comprising receiving, comparing, setting and rendering steps is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally or without a machine.

---

[1] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).
[2] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

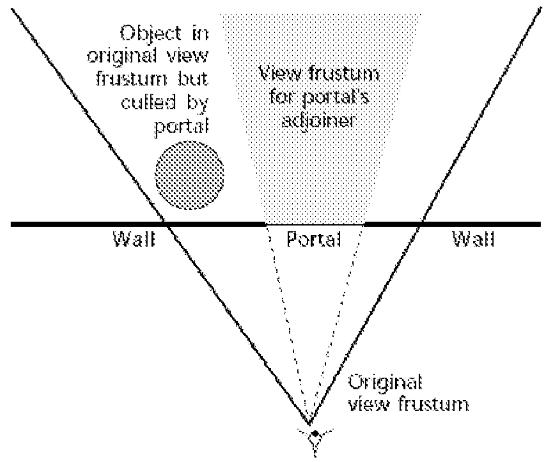
> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1-7 and 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duluk, Jr. et al. (U.S. Patent No. 6, 577, 317 B1) in view of Bishop et al. (Designing a PC Game Engine).

In regard to claim 1 it is noted that the respective claim language discloses open-ended language (e.g., comprising) and as such said claim is not considered to be limited to only the limitations disclosed. Duluk, Jr. et al. teach an apparatus and methods for rendering 3D graphics (col. 1, ll. 63-67; col. 4, ll. 40-46). Duluk, Jr. et al. teach that a command-fetch-and-decode block 841 handles communication with the host computer through the graphics port. It converts its input into a series of packets, which it passes to the geometry block 842. Most of the input stream (e.g., packets) consists of geometrical data, that is to say, vertices that describe lines, points and polygons (col. 6, ll. 23-28). Duluk, Jr. et al. teach that the geometry block 842 transforms incoming graphics primitives into a uniform coordinate space ("world space"). It then clips the primitives to the viewing volume ("frustum"). It is noted that said viewing volume (“frustum”) is considered to read on a bounding volume object. Duluk, Jr. et al. teach that in addition to the six planes that define the viewing volume (left, right, top, bottom, front and back) the subsystem provides six user-definable

clipping planes (col. 6, ll. 38-43). Duluk, Jr. et al. further teach that the trivial reject/accept test for both the user defined and the view volume clip planes are performed on each vertex (col. 13, ll. 35, 36). Duluk, Jr. et al. teach that information passed to said geometry block 842 and processed for output is output via packets ("There are four types of packets output form the geometry block 842…" – col. 17, ll. 7-10).

It is noted that the view volume (e.g., bounding volume object) illustrated in Fig. 1 is considered to read on a geometric representation of a specific object as said view volume is itself a 3D geometric object whose geometry dictates visibility (e.g., objects outside the bounds of said view volume are culled – aka view-frustum culling). It is noted that Fig. 1 also illustrates a triangulated object for display located within said view volume (e.g., said triangulated object is identified as geometry whose visibility status is desired). However, Duluk, Jr. et al. fail to explicitly teach wherein said bounding volume object (e.g., view frustum) is a geometric representation of a specific object identified as geometry whose visibility status is desired (e.g., a window or doorway – Specification, ¶ 11). Bishop et al. teach a bounding volume object (e.g., view frustum) which is a geometric representation, at least in part, of a specific object (e.g., portal/window) identified as geometry whose visibility status is desired (p. 50, Fig. 5). It is noted that said illustrated portal, which is located on a wall, is considered to be visible.



It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Bishop et al. into the system taught by Duluk, Jr. et al., because through such incorporation it would provide a means of reducing the amount of processing necessary for determining visible objects within a given scene by modifying the size of the view frustum so to not include objects which cannot be seen (e.g., are behind a wall) and thus would result in a system with increased efficiency. For example, the wider view frustum may include objects which are not visible due to said wall, assuming said wall is not invisible, and thus it would improve efficiency by limiting said view frustum to said portal which is able to be seen through.

Duluk, Jr. et al. teach that for each plurality of draw packets (e.g., packets sent to geometry block 842), if the draw packet is deemed potentially visible (e.g., it is not discarded), setting a visibility query identifier (e.g., Passthrough flag = TRUE), wherein the visibility query identifier corresponds to a single bit indicator (The command-fetch-and-decode block 841 queues up packet data for the geometry block 842, and when a complete packet and command word exist, it signals by raising the Data_Ready flag ...

The global command word's second and third most significant bits (MSBs) determine how the geometry block 842 processes the packet. The bits are the Passthrough and the Vertex flags. If set (TRUE), the Passthrough flag indicates the packet passes through to the mode-extraction block 843. If clear (FALSE), the flag indicates that the geometry block 842 processes/consumes the packet." – col. 14, ll. 35-58). Duluk, Jr. et al. teach that there are four types of packets output from the geometry block 842: color vertex, spatial vertex, propagated mode, and propagated vertex (col. 17, ll. 7-10). A Color Vertex packet contains the properties associated with a vertex's position. Every vertex not removed by back face culling or clipped off by volume clip planes (trivial reject or multiply planes exclude complete polygon) produces a single vertex color packet. A Spatial Vertex packet contains the spatial coordinates (e.g., indices) and relationships of a single vertex. Every input vertex packet not removed by back face culling or clipped off by volume clip planes (trivial reject or multiply planes exclude complete polygon) produces a spatial vertex packet corresponding to the exact input vertex coordinates (col. 17, ll. 14-29).

Duluk, Jr. et al. teach the use of a frame buffer for storing a finished frame, wherein said frame is created from information stored within said packets having a set visibility query identifier after being processed by the pipeline illustrated in Fig. 3, and sending said frame to an output device (e.g., a monitor) for display ("The back-end block 84C receives a tile's worth of pixels at a time from the pixel block 84B and stores them into the framebuffer 84G ... In addition to controlling the framebuffer 84G, the back-end block 84C performs pixel-ownership tests, 2D drawing and sends the finished

frame to the output devices. The block 84C provides the interface between the framebuffer 84G and the monitor 831 and video output." – col. 8, ll. 59-67, to col. 9, ll. 1-3; Fig. 3).

5. In regard to claim 2 it is noted that the respective claim language fails to disclose what constitutes a command processor and therefore geometry block 842 is considered to read on a command processor. Duluk, Jr. et al. teach prior to rendering (e.g., further processing) said draw packets providing said draw packets said geometry block 842 wherein a check is performed whether said visibility query identifier is set (col. 14, ll. 35-58).

6. In regard to claim 3 it is noted that respective claim language fails to disclose what exactly constitutes an index or indices for a given packet. Thus, a packet index is considered to read on any identifier (e.g., a memory address, packet size, location of the packet within a transmission sequence of a plurality of packets, etc.) that is conventionally used to identify a respective packet within an electrical system. It is noted that anytime a packet is processed (e.g., transmitted or received for further processing) a respective packet index is considered to either be created or fetched as without the use of some index to identify said packet said packet and the respective information contained within said packet would be unable to be utilized in any fashion within said system. The rationale disclosed in the rejection of claim 1 is incorporated herein (col. 17, ll. 14-29).

7. In regard to claim 4 the rationale disclosed in the rejection of claim 1 is incorporated herein ("…geometry block 842 … then clips the primitives to the viewing

volume…" – col. 6, ll. 38-43; "…There are four types of packets output from the geometry block 842: color vertex, spatial vertex..." – col. 17, ll. 7-10). As previously disclosed said spatial vertex packet contains the spatial coordinates and relationships of a single vertex (col. 17, ll. 14-29). It is noted that both said spatial coordinates and said spatial relationships would not be available if a given spatial vertex packet, which is indicated as containing data relevant to visibility by virtue of the fact that is was generated and not culled or clipped, was not output by geometry block 842.

Duluk, Jr. et al. teach when the visibility query identifier is not set (e.g., Passthrough = FALSE), indicating that a particular draw packet is not visible, the command processor discard the draw packet prior to fetching a plurality of indices ("…If set (TRUE), the Passthrough flag indicates the packet passes through to the mode-extraction block 843. If clear (FALSE), the flag indicates that the geometry block 842 processes/consumes the packet." – col. 14, ll. 35-58).

8. In regard to claim 5 Duluk, Jr. et al. teach that a duration counter tracks the time a vertex is in the stage 212 of the transformation unit (col. 20, ll. 37, 38; Fig. 4). Said transformation unit is part of geometry block 842 (Fig. 2) and geometry block 842 is located before mode-extraction block 843. Stage A 212 could require more than one pipeline cycle to process the packet, depending on the type of packet it is and the state that is set in the stage. If more than one pipeline cycle is required, the stage raises the Pipeline_Full signal. If Pipeline_Full is raised, the unit controller is not allowed to advance the next packet down the pipe. When the stage detects that the packet will complete in the current stage, the Pipeline_Full signal is cleared, and just as the unit

controller advanced the command register of stage A, stage A advances the command register of stage B (col. 18, ll. 25-63).

9. In regard to claim 6, specifically view frustum comparison, the rationale disclosed in the rejection of claim 1 is incorporated herein (col. 6, ll. 38-43; col. 13, ll. 35, 36).

10. In regard to claim 7 the rationale disclosed in the rejections of claims 1-4 are incorporated herein.

11. In regard to claim 9 the rationale disclosed in the rejection of claim 5 is incorporated herein.

12. In regard to claim 10 the rationale disclosed in the rejection of claim 6 is incorporated herein.

13. In regard to claim 11 Duluk, Jr. et al. illustrates in Fig. 8 that said apparatus includes CPU 810 (e.g., general processing unit) and memory 820 (e.g., memory device) for storing CPU-executable instructions (e.g., software 821). The rationale disclosed in the rejection of claim 1 is incorporated herein.

14. In regard to claim 12 the rationale disclosed in the rejection of claim 2 is incorporated herein.

15. In regard to claim 13 the rationale disclosed in the rejection of claim 3 is incorporated herein.

16. In regard to claim 14 the rationale disclosed in the rejection of claim 4 is incorporated herein.

17. In regard to claim 15 the rationale disclosed in the rejection of claim 5 is incorporated herein.

18. In regard to claim 16 the rationale disclosed in the rejection of claim 6 is incorporated herein.

19. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duluk, Jr. et al. (U.S. Patent No. 6, 577, 317 B1) and Bishop et al. (Designing a PC Game Engine), as applied to claims 1-7 and 9-16, in view of Migdal et al. (U.S. Patent No. 5, 886, 702).

20. In regard to claim 17 the rationale disclosed in the rejection of claim 1 is incorporated herein. However, Duluk, Jr. et al. and Bishop et al. fail to explicitly teach wherein the geometric representation of the specific object is a low resolution model of the specific object that is rendered prior to a detailed model of the specific object. Migdal et al. teach a system and method for dynamic resolution capabilities in the level of detail for creating meshes (col. 4, ll. 54-67; col. 5, ll. 1-12), wherein a geometric representation (e.g., mesh) of a specific object (e.g., face) is a low resolution model of the specific object that is rendered prior to a detailed model of the specific object being rendered (col. 7, ll. 65-67; col. 8, ll. 1-13; Figs. 2B-2F).

It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Migdal et al. into the system taught by Duluk, Jr. et al. and Bishop et al., which is directed toward geometry operations in a 3D graphics pipeline (Duluk, Jr. et al. – col. 1, ll. 63-67), because through such incorporation it would provide greater flexibility in terms of the geometry processed by said system by allowing, for example, an operator of system to specify geometry of greater or lower detail depending upon the requirements that need to be met at a given

point in time while still allowing said geometry be altered at a later stage (e.g., by having its resolution increased or decreased). Said flexibility would result in a more optimized and efficient system then if said flexibility were not present in said system.

21. In regard to claim 18 the rationale disclosed in the rejection of claims 2 and 4 are incorporated herein.

22. In regard to claim 19 the rationale disclosed in the rejection of claim 5 is incorporated herein.

Response to Arguments

23. In response to Applicant's remarks that Duluk, Jr. et al. fails to teach or suggest the respective amendment claim language the Applicant is directed to the respective above rejections which have been clarified to address Applicant's remarks. Specifically, Duluk, Jr. et al. teach that for each plurality of draw packets (e.g., packets sent to geometry block 842), if the draw packet is deemed potentially visible (e.g., it is not discarded), setting a visibility query identifier (e.g., Passthrough flag = TRUE), wherein the visibility query identifier corresponds to a single bit indicator (The command-fetch-and-decode block 841 queues up packet data for the geometry block 842, and when a complete packet and command word exist, it signals by raising the Data_Ready flag ... The global command word's second and third most significant bits (MSBs) determine how the geometry block 842 processes the packet. The bits are the Passthrough and the Vertex flags. If set (TRUE), the Passthrough flag indicates the packet passes through to the mode-extraction block 843. If clear (FALSE), the flag indicates that the geometry block 842 processes/consumes the packet." – col. 14, ll. 35-58).

24. Applicant's remarks have been fully considered but they are not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER-ANTHONY PAPPAS whose telephone number is 571-272-7646. The examiner can normally be reached on M-F 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on 571-272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter-Anthony Pappas/
Primary Examiner, Art Unit 2628